

**Claims**

1. A virtual simulator system for neuromuscular training and certification via a communication network, comprising:

a database connectable to the communication network, the database storing data relative to a code of conduct, state-of-the-art, physics law equations, technical code and technique for physical activities requiring training and certification for a user, and training scenarios complying with the code of conduct, state-of-the-art, physics law equations, technical code and technique;

a multimedia device connectable to the communication network, the multimedia device having a stopwatch circuit and an input device for interaction with a user; and

an on-line simulator processor connectable to the communication network, the on-line simulator processor performing operations comprising:

retrieving data representative of one of the training scenarios from the database in response to a user selection on the multimedia device;

generating test elements, parameters and controls based on the data;

monitoring online use of the input device by the user;

performing calculations of a simulated environment on time and online in response to the use of the input device by the user and management of the test elements, parameters and controls by the user;

generating real time images on the multimedia device replicating the simulated environment according to the management of the test elements by the user as a function of run-time data provided by the stopwatch circuit; and

recording the test elements in the database.

2. The virtual simulator system according to claim 1, wherein the operations performed by the on-line simulator processor further comprise:

producing warning signals on the multimedia device depending on actions performed by the user with respect to a variable bracket of successful results determined using the data stored in the database.

3. The virtual simulator system according to claim 1, wherein the operations performed by the on-line simulator processor further comprise:

recording the real time images in the database; and  
processing the real time images to certify code and rule-of-the-art compliance.

4. The virtual simulator system according to claim 3, wherein the operations performed by the on-line simulator processor further comprise:

analyzing the real time images and the test elements to produce test result data;  
comparing the test result data with model result data stored in the database and producing consequent markings of the test result data; and  
recording the markings in the database.

5. The virtual simulator system according to claim 4, wherein the operations performed by the on-line simulator processor further comprise:

building a learning curve according to the markings; and  
storing the learning curve in the database.

6. The virtual simulator system according to claim 1, wherein the operations performed by the on-line simulator processor further comprise:

compiling the real time images and the test elements of successive tests performed by the user into the database in a form of playbacks selectively playable on the multimedia device in response to a user request.

7. The virtual simulator system according to claim 1, wherein the database is formed of an information system database unit and a virtual database unit, the data relative to a code of conduct, state-of-the-art, physics law equations, technical code and technique for physical activities requiring training and certification for a user, and training scenarios being stored in the information system database unit, the test elements being stored in the virtual database.

8. The virtual simulator system according to claim 1, wherein the multimedia device comprises a user interface displaying the real time images.

9. The virtual simulator system according to claim 8, wherein the user interface comprises a process data sheet showing an illustration of an object subjected to the test, instructions for performing the test, and the test elements and parameters.

10. The virtual simulator system according to claim 9, wherein the process data sheet provides the test controls for setting up the simulated environment and configuring the test parameters.

11. The virtual simulator system according to claim 9, wherein the illustration of the object is taken out from an animation movie stored in the database.

12. The virtual simulator system according to claim 8, wherein the user interface comprises a first window section displaying the test elements, and a second window section displaying the test parameters and controls.

13. The virtual simulator system according to claim 8, wherein the operations performed by the on-line simulator processor further comprise:

processing the real time images for destructive and non-destructive examination of the test elements on the multimedia device in response to a user request.

14. The virtual simulator system according to claim 4, wherein the test elements comprise speed and spatial data.

15. The virtual simulator system according to claim 1, wherein the physic law equations fall under mechanical, kinematic, dynamic and thermodynamic laws related to neuromuscular functions.

16. The virtual simulator system according to claim 1, wherein the input device comprises a motion capture input device, the management of the test elements, parameters and controls being performed using the computer input device and an associated motion capture input device cursor on a display of the multimedia device.

17. The virtual simulator system according to claim 16, wherein the management comprises a translation movement of the test elements in response to a motion of the mouse cursor.

18. The virtual simulator system according to claim 1, wherein the real time images show a progression of the test elements from all angles.

19. The virtual simulator system according to claim 1, wherein the test elements, parameters and controls are all user configurable variables.

20. The virtual simulator system according to claim 1, wherein the operations performed by the on-line simulator processor further comprise:

classifying the management as the physical activities in the database.

21. The virtual simulator system according to claim 1, wherein the operations performed by the on-line simulator processor further comprise:

managing said one of the training scenarios by inputting the test parameters for said one of the training scenarios, checking the test parameters until conformity with the technical code to produce a valid training scenario, and updating said one of the training scenarios with the valid training scenario.

22. The virtual simulator system according to claim 1, wherein the operations performed by the on-line simulator processor further comprise:

selectively providing access to the test elements stored in the database as a function of the user.

23. A virtual simulator method for neuromuscular training and certification via a communication network, comprising the steps of:

storing data relative to a code of conduct, state-of-the-art, physics law equations, technical code and technique for physical activities requiring training and certification for a user, and training scenarios in a database connectable to the communication network;

providing a multimedia device connectable to the communication network, the multimedia device having a stopwatch circuit and an input device for interaction with a user; and

through an on-line simulator processor connectable to the communication network, performing operations comprising:

retrieving data representative of one of the training scenarios from the database in response to a user selection on the multimedia device;

generating test elements, parameters and controls based on the data;

monitoring online use of the input device by the user;

performing calculations of a simulated environment on time and online in response to the use of the input device by the user and management of the test elements, parameters and controls by the user;

generating real time images on the multimedia device replicating the simulated environment according to the management of the test elements by the user as a function of run-time data provided by the stopwatch circuit; and

recording the test elements in the database.

24. The virtual simulator method according to claim 23, wherein the operations further comprise:

managing said one of the training scenarios by inputting the test parameters for said one of the training scenarios, checking the test parameters until conformity with the technical code to produce a valid training scenario, and updating said one of the training scenarios with the valid training scenario.

25. The virtual simulator method according to claim 23, wherein the operations further comprise:

configuring the database with the on-line simulator processor as a function of the test parameters.

26. The virtual simulator method according to claim 23, wherein the operations further comprise:

producing warning signals on the multimedia device depending on actions performed by the user with respect to a variable bracket of successful results determined using the data stored in the database.

27. The virtual simulator method according to claim 23, wherein the operations further comprise:

recording the real time images in the database; and  
processing the real time images to certify code and rule-of-the-art compliance.

28. The virtual simulator method according to claim 27, wherein the operations further comprise:

analyzing the real time images and the test elements to produce test result data;  
comparing the test result data with model result data stored in the database and producing consequent markings of the test result data; and  
recording the markings in the database.

29. The virtual simulator method according to claim 28, wherein the operations further comprise:

building a learning curve according to the markings; and  
storing the learning curve in the database.

30. The virtual simulator method according to claim 23, wherein the operations further comprise:

compiling the real time images and the test elements of successive tests performed by the user into the database in a form of playbacks selectively playable on the multimedia device in response to a user request.

31. The virtual simulator method according to claim 23, wherein the database is formed of an information method database unit and a virtual database unit, and the step of storing comprises storing the data relative to a code of conduct, state-of-the-art, physics law equations, technical code and technique for physical activities requiring training and certification for a user, and training scenarios in the information method database unit and storing the test elements in the virtual database.

32. The virtual simulator method according to claim 23, further comprising the step of displaying the real time images generated by the on-line simulator processor on a user interface of the multimedia device.

33. The virtual simulator method according to claim 23, further comprising the steps of displaying a process data sheet on a user interface of the multimedia device, the process data sheet showing an illustration of an object subjected to the test, instructions for performing the test, and the test elements and parameters.

34. The virtual simulator method according to claim 33, wherein the process data sheet provides the test controls for setting up the simulated environment and configuring the test parameters.

35. The virtual simulator method according to claim 33, wherein the illustration of the object is taken out from an animation movie stored in the database.

36. The virtual simulator method according to claim 33, further comprising the steps of:

displaying the test elements in a first window section of the user interface; and  
displaying the test parameters and controls in a second window of the user interface.

37. The virtual simulator method according to claim 23, wherein the operations further comprise:

processing the real time images for destructive and non-destructive examination of the test elements on the multimedia device in response to a user request.

38. The virtual simulator method according to claim 23, wherein the test elements comprise speed and spatial data.

39. The virtual simulator method according to claim 23, further comprising the step of establishing the physic law equations as a function of mechanical, kinematic, dynamic and thermodynamic laws related to neuromuscular functions.

40. The virtual simulator method according to claim 23, wherein the input device comprises a motion capture input device, the management of the test elements, parameters and controls being performed using the motion capture input device and an associated motion capture input device cursor on a display of the multimedia device.

41. The virtual simulator method according to claim 40, wherein the management comprises a translation movement of the test elements in response to a motion of the mouse cursor.

42. The virtual simulator method according to claim 23, wherein the real time images show a progression of the test elements from all angles.

43. The virtual simulator method according to claim 23, wherein the test elements, parameters and controls are all user configurable variables.

44. The virtual simulator method according to claim 23, wherein the operations further comprise:

classifying the management as the physical activities in the database.

45. The virtual simulator method according to claim 23, wherein the operations further comprise:

managing said one of the training scenarios by inputting the test parameters for said one of the training scenarios, checking the test parameters until conformity with the technical code to produce a valid training scenario, and updating said one of the training scenarios with the valid training scenario.

46. The virtual simulator method according to claim 23, wherein the operations further comprise:

selectively providing access to the test elements stored in the database as a function of the user.

47. A multimedia device connectable to a virtual simulator system having an on-line simulator processor and a database for neuromuscular training and certification via a communication network, comprising:

a stopwatch circuit;

an input device;

a user interface;

a port for communication with the on-line simulator processor through the communication network; and



a processor connected to the stopwatch circuit, the input device, the user interface and the port, the processor comprising means for:

transmitting data produced by use of the input device on the user interface to the on-line simulator processor via the port;

receiving test elements, parameters and controls and simulated environment data from the on-line simulator processor via the port;

monitoring a management of the test elements, parameters and controls by the user as a function of run-time data provided by the stopwatch circuit; and

displaying real time images on the user interface replicating a simulated environment using the simulated environment data according to the management by the user.

48. An apparatus for neuromuscular training and certification on a multimedia device via a communication network, comprising

a database connectable to the communication network, the database storing data relative to a code of conduct, state-of-the-art, physics law equations, technical code and technique for physical activities requiring training and certification for a user, and training scenarios complying with the code of conduct, state-of-the-art, physics law equations, technical code and technique; and

an on-line simulator processor connectable to the communication network, the on-line simulator processor performing operations comprising:

retrieving data representative of one of the training scenarios from the database in response to a request received from the multimedia device representing a user selection;

generating test elements, parameters and controls based on the data;

communicating the test elements, parameters and controls to the multimedia device;

monitoring user activity data received from the multimedia device;

performing calculations of a simulated environment on time and online in response to the user activity data in relation with the test elements, parameters and controls;

transmitting simulation data to the multimedia device causing the multimedia device to generate real time images replicating the simulated environment according to the user activity data; and

recording the test elements in the database.

49. A computer readable memory having recorded thereon statements and instructions for execution by a computer system to carry out the method of claim 23.

50. A computer program product, comprising:

a memory having computer readable code embodied therein, for execution by an on-line simulator processor, for neuromuscular training and certification via a communication network, said code comprising:

code means for storing data relative to a code of conduct, state-of-the-art, physics law equations, technical code and technique for physical activities requiring training and certification for a user, and training scenarios in a database connected to the communication network; and

code means for retrieving data representative of one of the training scenarios from the database in response to a user selection on a multimedia device connected to the communication network;

code means for generating test elements, parameters and controls based on the data;

code means for monitoring online use of an input device on the multimedia device by the user;

code means for performing calculations of a simulated environment on time and online in response to the use of the input device by the user and management of the test elements, parameters and controls by the user;

code means for generating real time images on the multimedia device replicating the simulated environment according to the management of the test elements by the user as a function of run-time data provided by a stopwatch circuit of the multimedia device; and

code means for recording the test elements in the database.

51. A carrier wave embodying a computer data signal representing sequences of statements and instructions which, when executed by an on-line simulator processor, cause the on-line simulator processor to perform a virtual simulation for neuromuscular training and certification via a communication network, the statements and instructions comprising the steps of:

storing data relative to a code of conduct, state-of-the-art, physics law equations, technical code and technique for physical activities requiring training and certification for a user, and training scenarios in a database connected to the communication network; and

retrieving data representative of one of the training scenarios from the database in response to a user selection on a multimedia device connected to the communication network;

generating test elements, parameters and controls based on the data;

monitoring online use of an input device on the multimedia device by the user;

performing calculations of a simulated environment on time and online in response to the use of the input device by the user and management of the test elements, parameters and controls by the user;

generating real time images on the multimedia device replicating the simulated environment according to the management of the test elements by the user as a function of run-time data provided by a stopwatch circuit of the multimedia device; and

recording the test elements in the database.

52. A memory for storing data for access by an application program being executed on a data processing system, comprising:

a data structure stored in the memory, the data structure including information resident in a database used by the application program and including:

code of conduct data;

state-of-the-art data;

physics law equation data;

technical code and technique data for physical activities requiring training and certification for a user; and  
training scenarios complying with the code of conduct, state-of-the-art, physics law equations, technical code and technique, to be used by the application program to generate test elements, parameters and controls for neuromuscular training and certification via a communication network.